

## DOCKING APPARATUS FOR PC CARD DEVICES

Inventor:

Sunny Behl

5721 Tubac Lane

San Jose, California 95118

Attorney:

Law Offices of Kevin H. Fortin

Twin Oaks Office Plaza, Suite 112

477 Ninth Avenue

San Mateo, CA 94402

(650) 685-9270

## FIELD OF THE INVENTION

The present invention pertains to memory storage devices and more particularly to mechanisms for docking PC card-type devices in memory storage device bays.

## BACKGROUND OF THE INVENTION

PC cards are widely used in laptop computers for interconnecting devices including modems, network cards, flash memory, and miniature hard disk drives to the laptop computer. One major benefit of the PC cards is that they are very small. Some are sized smaller than credit-cards.

PC cards are now being used in cameras and other devices for storing data, sound and images. Some digital cameras have PC card technology, including flash memory, to record digital photographs. PC cards are removable from the camera to transport the images to a laptop or other computer. Accordingly, the recorded image can be viewed and/or printed. Most laptop computers have PC card slots built in.

Although the demand for PC card based devices such as digital cameras has increased in recent years, many desk top type personal computers are not specifically adapted to accommodate PC cards. Various externally connectable PC card devices have been developed. A typical externally connectable PC card device plugs into the parallel,

1 or serial port of a standard personal computer. Power is supplied to the PC card device  
2 from an external plug, or from a keyboard connection, for example.

3 Many computer users have speakers, printers, scanners, lamps and other power  
4 drawing devices plugged in near the computer system creating a tangled mess of wire.  
5 Additional wires for a PC card device are undesirable. What is desired is a PC card  
6 device that does not require additional wires and which conveniently connects to a  
7 personal computer.

8 FIG. 1 shows a docking assembly 10 and carrier 12. The docking assembly 10 is  
9 fixed in a hard drive bay of a typical personal computer 14. The personal computer 14 has  
10 an internal power supply 16 and an IDE ribbon cable 18. The docking assembly 10  
11 couples with the power supply 16 and the IDE ribbon cable 18 of the computer 14. The  
12 docking assembly 10 includes a plug 20 for receiving the carrier 12.

13 The carrier 12 includes a base 22 and a cover 24 for housing a hard drive <sup>26</sup>~~16~~. The  
14 carrier 12 slides into the docking assembly 10 to couple the hard drive 26 with the power  
15 supply 16 and the IDE ribbon cable 18. Computer users rely on carriers 12 to selectively  
16 interconnect multiple disk drives to the personal computer 14 having a docking assembly  
17 10.

#### 18 Summary of the Invention

19 The present invention is a way of providing a way of interconnecting a PC card  
20 device to a personal computer. This is accomplished in a simple way without an  
21 excessive bundle of wires, or external power connections. Since personal computers  
22 typically have a limited number of IDE connections and memory storage device bays, the  
23 carrier of the present invention is removable to enable sharing of the IDE connection and  
24 memory storage device bay, when a PC card is not in use.

25 The present invention includes a carrier and a docking assembly. The docking  
26 assembly is configured to be fixed in a standard-sized bay of a computer housing, or  
27 memory storage device housing. The docking assembly includes a pair of lateral sides  
28 for fixing the docking assembly in a memory storage device bay. Preferably, the docking  
29 assembly has width of 5 ¼ inches for inserting the carrier in a 5 ¼ inch memory storage

Sub 82  
1 bay. Alternatively, the docking assembly has a width of 3 ½ inches for inserting the  
2 carrier in a 3 ½ inch memory storage bay.

3 The docking assembly also includes a power connector and an IDE cable  
4 connector for coupling the docking assembly to a power source and an IDE interface,  
5 respectively. The docking assembly also includes a docking assembly plug for  
6 removeably receiving the carrier. The carrier includes a PC card device and adapter  
7 circuitry including a plug. The PC card device receives PC cards and the plug  
8 removeably couples the carrier with the docking assembly plug.

9  
10 Brief Description of the Drawings:

11 FIG. 1 is a perspective view of a known hard disk drive docking assembly and  
12 carrier.

13 FIG. 2 is an exploded perspective view of a PC Card carrier in accordance with  
14 the present invention.

15 FIG. 3 is an exploded perspective view of a carrier including a fan.

16 FIG. 4 is a perspective view of an embodiment of a circuit board design for the  
17 PC Card carrier.

18  
19 Detailed Description of the Invention:

20 FIG. 2 shows a docking assembly 10 and a carrier 32. The docking assembly 10 is  
21 adapted for coupling with an IDE ribbon cable. The docking assembly 10 includes a pair  
22 of lateral sides 34. The sides 34 fix the docking assembly 10 within a memory storage  
23 device bay of a personal computer, for example, to enable the docking assembly to couple  
24 with the IDE ribbon cable in the personal computer. It can be appreciated, however, that  
25 the present invention can also be used in a memory storage device housing, or other  
26 housing having a memory storage device bay. Further, although an IDE ribbon cable  
27 interface is shown, the docking assembly 10 and carrier 32 combination can be  
28 configured for use with a SCSI or other desired interface. As various interface standards  
29 evolve, the docking assembly 10 and carrier 32 combination can be adapted to fit each of  
30 those standards without departing from the scope and spirit of the invention.

1 The docking assembly 10 has a front 36 and a rear 38. The rear 38 includes a  
2 power connector 40 and a ribbon cable connector 42. The front 36 includes a lock 44 for  
3 holding the carrier 32 within the docking assembly 10.

4 The docking assembly 10 includes a width "w". The width "w" is 5 ¼ inches to  
5 fit in a 5 ¼ inch memory storage bay. In an alternate embodiment of the invention, the  
6 width "w" 3 ½ inches to fit in a 3 ½ inch memory storage bay. It can be appreciated that  
7 although this invention is configured in size to fit in standard memory storage bay sizes,  
8 the invention can be adapted as the memory storage bay size standards evolve.

9 The docking assembly 10 includes a plug 46 for removeably coupling the carrier  
10 32 to the docking assembly 10. The carrier 32 has a plug 48 for mating with the plug <sup>20</sup>46  
11 of the docking assembly 10. The docking assembly 10 has rails 50 defined on each of the  
12 lateral sides 34 for guiding and aligning the carrier 32. The carrier 32 has rails 52 to mate  
13 with the rails 50 of the docking assembly 10.

14 The carrier 32 has a front <sup>into B1</sup>52 and a folding handle 54. The folding handle 54  
15 mounts on the front 52. The front 52 of the carrier 32 defines an opening for receiving a  
16 PC card. Although a folding handle 54 is shown, any handle type to enable removal of  
17 the carrier 32 from the docking assembly 10 will do.

18 <sup>the</sup>PC card device 62 <sup>into B2</sup>mounts in the carrier 32 to receive PC cards. The PC card  
19 device 62 is adapted for PCMCIA standard type I, II, or III type flash memory cards.  
20 According to an aspect of the invention, the PC card device 62 is adapted for Compact  
21 Flash, ATA Flash, or PCMCIA hard disks. The PC card device 62 can be adapted to  
22 receive other cards of like, or smaller, sizes. The PC card device 62 is capable of reading  
23 and writing data to the PC cards. <sup>add</sup>

24 The PC card device 62 includes adapter circuitry <sup>see Figure 3</sup>64. The circuitry 64 couples the  
25 PC card device 62 with the plug 48 so that the PC card device 62 can communicate with,  
26 for example, either an IDE or SCSI interface.

27 FIG. 3 includes the PC card device 62 and a fan 66 mounted in the carrier 32. The  
28 fan 66 couples with the plug 48 to draw power. It can be appreciated that the carrier 32  
29 enables interconnection of any of a variety of devices, including PC card devices, hard  
30 disk drives, cooling fans, etc. to a docking assembly in a memory storage device bay.

1 FIG. 4 shows a portion of the PC card device 62 including adapter circuitry 64.  
2 The circuitry includes a PCMCIA type III slot 68, a COMPACT FLASH slot 70, an IDE  
3 interface pin connector 72 and the plug 48. A ribbon cable 74 couples the pin connector  
4 72 with the plug 48. <sup>a plug 88</sup>

5 The circuitry 64 mounts in the carrier 32 (FIG. 3). Both slots 68 and 70 receive  
6 PC cards. The circuitry 64 adapts the PC card slots 68 and 70 to communicate with the  
7 IDE interface pin connector 72. Accordingly the circuitry 64 enables PC cards to  
8 communicate with a docking assembly via the plug 48. The circuitry 64 is configured so  
9 that the PCMCIA slot 68 and the COMPACT FLASH slot 70 are offset so that both slots  
10 68 and 70 can be used simultaneously.

11 This detailed description is presented by way of example only. Various  
12 modifications, additions and variations of the disclosed apparatus are possible.  
13 Accordingly, the invention is to be limited only by the claims below.  
14